



## Development and application of earth system models

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### Abstract:

The global environment is a complex and dynamic system. Earth system modeling is needed to help understand changes in interacting subsystems, elucidate the influence of human activities, and explore possible future changes. Integrated assessment of environment and human development is arguably the most difficult and most important "systems" problem faced. To illustrate this approach, we present results from the integrated global system model (IGSM), which consists of coupled submodels addressing economic development, atmospheric chemistry, climate dynamics, and ecosystem processes. An uncertainty analysis implies that without mitigation policies, the global average surface temperature may rise between 3.5 °C and 7.4 °C from 1981-2000 to 2091-2100 (90% confidence limits). Polar temperatures, absent policy, are projected to rise from about 6.4 °C to 14 °C (90% confidence limits). Similar analysis of four increasingly stringent climate mitigation policy cases involving stabilization of greenhouse gases at various levels indicates that the greatest effect of these policies is to lower the probability of extreme changes. The IGSM is also used to elucidate potential unintended environmental consequences of renewable energy at large scales. There are significant reasons for attention to climate adaptation in addition to climate mitigation that earth system models can help inform. These models can also be applied to evaluate whether "climate engineering" is a viable option or a dangerous diversion. We must prepare young people to address this issue: The problem of preserving a habitable planet will engage present and future generations. Scientists must improve communication if research is to inform the public and policy makers better.

**Source:** <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3586611>

### Resource Description

#### Climate Scenario :

specification of climate scenario (set of assumptions about future states related to climate)

Special Report on Emissions Scenarios (SRES)

**Special Report on Emissions Scenarios (SRES) Scenario:** SRES A2

#### Communication:

resource focus on research or methods on how to communicate or frame issues on climate change; surveys of attitudes, knowledge, beliefs about climate change

# Climate Change and Human Health Literature Portal

A focus of content

## **Communication Audience:** ☒

audience to whom the resource is directed

Policymaker, Public

## **Exposure :** ☒

weather or climate related pathway by which climate change affects health

Temperature, Unspecified Exposure

## **Geographic Feature:** ☒

resource focuses on specific type of geography

None or Unspecified

## **Geographic Location:** ☒

resource focuses on specific location

Global or Unspecified

## **Health Impact:** ☒

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

## **Mitigation/Adaptation:** ☒

mitigation or adaptation strategy is a focus of resource

Adaptation, Mitigation

## **Model/Methodology:** ☒

type of model used or methodology development is a focus of resource

Exposure Change Prediction

## **Resource Type:** ☒

format or standard characteristic of resource

Review

## **Timescale:** ☒

time period studied

Long-Term (>50 years)